Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.elsevier.com/locate/rpor

Original research article

Incidence of hospitalization in patients receiving short course palliative cranial radiotherapy on outpatient basis in a limited resource setting – Experience from a regional cancer center in India

Aparna Gangopadhyay[a,*], *Joydeep Das*[a], *Partha Nath*[b], *Tapas Maji*[a], *Jaydip Biswas*[b]

[a] *Dept. of Radiation Oncology, Chittaranjan National Cancer Institute, Kolkata, India*
[b] *Dept. of Medical Oncology, Chittaranjan National Cancer Institute, Kolkata, India*

ARTICLE INFO

Article history:
Received 20 February 2013
Received in revised form
5 February 2014
Accepted 5 April 2014

Keywords:
Palliative cranial radiation
Radiation toxicity and patient care
In-hospital care for brain metastases

ABSTRACT

Aim: To investigate incidence of toxicity and related hospitalization among patients treated at our institute by a short course of palliative cranial radiotherapy against a longer, widely established schedule.

Background: Shorter schedule palliative cranial radiotherapy is more convenient for patients and reduce waiting times. Although many studies have established safety of short schedules, the need for hospitalization due to acute treatment toxicity remains under-explored. Hospital admissions are an economic burden both for the patient and healthcare system in a limited resource setting. Delivery of treatment on an outpatient basis and within shorter times is preferred by patients, caregivers and healthcare staff.

Materials and methods: This was a prospective study on 68 patients treated with palliative whole brain radiotherapy between November 2010 and October 2012. One group received 20 Gy in 5 fractions over 1 week and the other group, 30 Gy in 10 fractions over 2 weeks. Treatment toxicity due to cranial radiotherapy was assessed as per RTOG acute and late toxicity criteria. Need for hospitalization owing to acute toxicity was also noted. Significant differences in the study parameters between the two groups were calculated by Fisher's t-test.

Results: Requirement for hospital stay due to acute toxicity was not significantly different between the two groups. Patients in both groups experienced similar toxicity both during and after treatment.

Conclusions: The shorter course entailed no significant increase in toxicity related admissions, suitable for limited resource settings where patient transport is difficult, there are financial constraints, and the healthcare system is overburdened.

* *Corresponding author at*: 377, M.B. Road, Panchanantala, Kolkata 700049, India. Tel.: +91 98363 86469.
E-mail address: mails7778@gmail.com (A. Gangopadhyay).

http://dx.doi.org/10.1016/j.rpor.2014.04.006

1. Background

During the course of treatment for cancer, many patients develop metastases to various organs, including the central nervous system (CNS). CNS metastases are not an uncommon initial presentation in many cancer patients and, indeed, accounts for the majority of CNS tumors.[1,2] In India, due to limited resources, a major proportion of the population, especially rural, do not have adequate access to healthcare services. Residing in remote areas with transport being difficult, treatment duration attains importance. Arranging transport or accommodation near the treatment center becomes a considerable economic burden. Under these circumstances, a short treatment schedule is preferred by most patients and their families. However, hospitals in our setting sometimes find it challenging to deliver short course treatment with larger dose per fraction on an outpatient basis, owing to a perception that larger dose per fraction delivered to the brain may cause greater acute radiation toxicity that may require hospitalization to manage. In such an event, with an overwhelming burden on indoor facilities, this would increase pressure on the department workflow and also be detrimental to patient safety if admission is not urgently possible. Additionally, the expenditure for supportive care is a financial burden on the patients' family as well.

Additionally, most patients usually present with large or multiple lesions. These are not amenable to treatment by methods other than whole brain radiotherapy (WBRT). Most rural patients who could benefit from surgery or alternative techniques, such as stereotactic radiotherapy, do not have access to those services. In the absence of alternative management, it is sometimes compelling to treat these patients with WBRT, too.

The safety of short schedule palliative WBRT has been established by clinical studies.[3,4] A review of literature reveals evidence suggesting similar progression and survival between short schedules of palliative WBRT, as opposed to the widely established 30 Gy in 10 fractions over 2weeks schedule.[5,6] Delivery of palliative radiotherapy for brain metastases in as few as 2 fractions has also been documented in certain situations, with comparable results.[7]

Cranial radiotherapy may lead to treatment-related toxicities that may be stressful to the patient and their caregivers. The toxicity-related hospital admission may put economic pressures on the healthcare system, on the patient and their families. A comprehensive search of Pubmed does not reveal studies that compare acute toxicity due to short fractionation schedules with that of prolonged schedules.

2. Aim

We compared the toxicity and the related need for hospitalization among patients treated with a 20 Gy in 5 fractions over 1 week schedule with 30 Gy in 10 fractions over 2 weeks. Primary endpoints were the incidence of acute toxicity and toxicity-related need for hospitalization. The secondary objective was the incidence of late toxicity.

3. Materials and methods

3.1. Patients

The study included 68 patients with brain metastases treated with palliative cranial radiotherapy at our institute between November 2010 and October 2012. Thirty-eight had received 30 Gy in 10 fractions over 2 weeks, whereas 30 patients had been treated with 20 Gy in 5 fractions over 1 week. Majority of the patients had breast or lung cancer. The patients who had received 30 Gy in 10 fractions over 2 weeks ($n = 38$) had similar characteristics as the group that received short course treatment ($n = 30$) (Table 1).

Five patients had brain metastases at initial diagnosis of cancer. Nineteen patients (63.33%) from the short course group and 30 patients (78.94%) from the group that received longer course of radiotherapy had only brain metastases at the time of cranial radiotherapy. Seven patients (23.33%) from the short course group and 5 patients (13.15%) from the other group had metastases to a single site apart from the brain at the time of receiving palliative cranial radiotherapy. Four patients (13.33%) from the short course group and 3 patients (7.89%) from the longer course group had metastases to more than one non-CNS site at the time of receiving cranial radiotherapy and these patients had a Karnofsky Performance Score of <40 at the time of cranial radiotherapy (Table 2).

3.2. Treatment

3.2.1. Radiation therapy

All patients received radiation to the whole brain once daily, five days per week.

Patients were treated in a supine position. Parallel opposed lateral fields were used with the gantry at 90° and 270°. The field borders were 2 cm beyond the skull in the superior, anterior, and posterior margin, and the lower border of C2 vertebra in the inferior margin. All patients were treated by telecobalt.

As per institutional protocol, all patients received dexamethasone 2 mg orally twice daily during the period of cranial radiotherapy.

3.2.2. Follow-up

Patients were assessed daily during radiotherapy by the physician for any symptoms of treatment-related acute toxicity. On completion of WBRT, they were seen after 1 week at the radiation oncology department to be assessed for any problems related to daily activities, self care and any worsening of symptoms since the completion of treatment. Also, it is necessary to address the caregivers concerns in view of the absence of social support services in our setting. After that, patients were followed up at medical or radiation oncology at 1 month, followed by 3 monthly for as long as the patient remained alive or attended hospital. Toxicity was graded using the RTOG acute and late toxicity criteria.

3.3. Statistical analysis

Data of patients who received 20 Gy in 5 fractions over 1 week ($n = 30$) was compared to that of the group treated by 30 Gy